

species. These hawk moths all have the same number of chromosomes and, where this is so conjugation of corresponding chromosomes derived from each parent is much more complete and fertility more probable than it is when the chromosome numbers differ. Some hybrid *Bistoninae* and *Saturniidae* also show partial fertility and secondary hybrids have been bred in large numbers. Thus, one of the criteria accepted as proof of specific rank when the journal was founded is now known to be invalid.

Progress during the last half-century has been phenomenally rapid and has taken place in many unexpected directions, but it has been dependent to a great extent on the belated recognition of Mendel's Law. One wonders whether there will be any discovery so fundamental as that of Mendel to record when the next fifty years are over and our journal celebrates its centenary.

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- Doncaster, L. (1908). 4th Rep. Evolution Com. Roy. Soc. Lond.
 Ford, E. B. (1937). "Problems of Heredity in the Lepidoptera." *Biol. Reviews*, 12, 461.
 Goldschmidt, R. (1933). "*Lymantria*." *Bibliographia Genetica*, XI.
 Harrison, J. W. H., and Garrett, F. C. (1926). *Proc. Roy. Soc.*, B. 99, 241.
 Morgan, T. H., and Bridges, C. B. (1919). "Origin of Gynandromorphs." Carnegie Institution of Washington. Publ. No. 278.
 Morgan, T. H., Bridges, C. B., and Sturtevant, A. H. (1925). "Genetics of *Drosophila*." *Bibliographia Genetica*, II.
 Onslow, H. (1921). *Journ. Genetics*, 11, 277.
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THE GRADUAL CHANGE IN THE LONGTIME INSULAR OUTLOOK OF THE BRITISH ENTOMOLOGIST.

By Rev. GEO. WHEELER, M.A., F.R.E.S.

The collecting and study of foreign insects by British entomologists, especially as influenced by the *Ent. Rec.*, being the subject assigned to me for our Jubilee Number, I naturally started by finding out what had been done in this direction before the publication of our magazine began. The earliest mention of anything of the kind which I have found is in the 1st Vol. of the *Entomologist* (1841), but this consists only of a few notes by Doubleday from the U.S.A. and a list by Gosse from a part of Canada. When its publication was resumed in 1864 a few more foreign lists occur but mostly from far distant lands, and there is hardly anything approaching an account of a "collecting expedition" for several years, in fact, till the Rev. Dr F. A. Walker began his account of his entomological wanderings in 1875, but even these are hardly in the style of later accounts. A few more entomologists, such as Mr W. E. Nicholson (Switzerland, 1885), Mr Norris (French Riviera, 1889), and Mrs Nicholl (Digne, 1890) gave more lively accounts, but they were few and far between. Such records in the *E.M.M.* are even fewer. Dr White on N. Italy in 1867 is the earliest I have found. A few names which appear later in the *Ent. Rec.* also occur in the *E.M.M.* Mr Bethune-Baker wrote on Algeria in 1886 and subsequently on French, Italian, and Swiss localities, and Mr A. H. Jones on some of the same localities in 1886; Messrs Nicholson and Lemann also wrote on their expedition in the Pyrenees in 1894, but this was after the beginning of the *Ent. Rec.*

The 1st vol. of our magazine, in which a foreign collecting holiday was described, was that by Mr Tutt in 1894, and this gave a sort of standard which was more or less followed in all such subsequent communications both by himself and others. Such accounts as these had certainly a very stimulating effect on their readers. Judging from the large number of people who wrote to me for information (and sometimes itineraries) after the publication of my Swiss articles, the fact of reading about such expeditions did incite entomologists to follow in the same steps, though it would have been more useful to try new ground.

Before giving a detailed account of such articles in the *Ent. Rec.* it will be well to explain the principle on which the information is founded. I have been through every mention of a foreign locality from the beginning of the publication to the end of last year. I have not reckoned in among the articles enumerated any short notes unless they implied an expedition not otherwise mentioned, and I have also as a rule omitted articles giving life-histories of individual species, though these are the most scientifically important, because they do not give information as to the extent of foreign travel involved. It should also be added that the date given is that of the publication, not necessarily of the expeditions themselves.

In 1894 only one such article was published, that by Mr Tutt on an expedition in the Italian Alps. His communications of a like nature continued up to the time of his death. (I have not taken as separate articles those which refer to the same "holiday." Mr Tutt often divided his accounts into short parts, each dealing with a single locality, a practice which, whether intentionally or not, served to concentrate attention on each in turn.) In 1895 there were two articles, the other being by Dr Chapman; his articles on these subjects continued till the war, the last appearing in 1914, though he contributed to the magazine on other subjects till his death early in 1922. In 1896 there were 4 articles, including one new name, that of Mr Crompton, which, however, does not appear again. In 1897 there were 5 articles, with 4 new names—Mr H. Rowland-Brown, Mr Postans, the Rev. C. J. Buckmaster, and Dr Burr. Of these Mr Rowland-Brown continued his contributions, six in number, till 1903. He afterwards transferred his articles to the *Entomologist*, of the staff of which he became a member. Dr Burr's contributions, 21 in number, have continued to the present time. 1898 produced 6 articles with 2 new contributors—Mr Lemann and the Rev. F. E. Lowe; the latter continued to contribute articles up to the time of the war; they were 9 in number. In 1899 8 articles appeared with 4 new names, among which was the first of my own on this subject, of which 15 have appeared; Mrs Nicholl also wrote in this magazine for the first time, and subsequently in 1901 and 1902, Mr W. J. Kaye contributed the first of his 7 articles dealing with localities in Central and South America. It would be tedious to give the names of all contributors, as many of them did not write again, and I can now only mention those who became more or less regular contributors either on this or some other subject. In 1900 there were again 8 articles, with 2 new names, neither of which recur. Up to this point the number of articles had steadily if slowly increased, but in 1901 there was a slight decline, only 6 articles appearing, but for the next 3 years a sudden increase occurred, 11 of these communications

appearing in each of these years. The 3 new contributors in 1902 are too well known to escape mention. These were Dr J. N. Keynes, who in collaboration with his son published 8 articles up to the time of the war; the Rev. A. Mills-Moss, and Miss Fountaine, who published her only article in this magazine. She had previously published one in the *Entomologist*, to which she afterwards returned. In 1903 Mr Sheldon wrote the first of his interesting articles, 4 more of which subsequently appeared, the last being in 1912. He, too, later joined the staff of the *Entomologist*, which secured his later papers, including his account of a Russian collecting tour in 1914. In the same year Mr Simes gave us the first of his 4 articles mostly on S. Italy, Mr Sloper the first of his two contributions on this subject, and Mr Sich one of his only 3 foreign articles. All the new contributors in 1904 continued to write for the magazine. Mr Douglas Pearson's 11 articles appeared in nearly every year up to the war, and again in 1921, 1922 and 1923. Mr Powell has continued to write at intervals, and Mr Muschamp contributed 5 articles up to the time of the war. In 1905 the contributions still amounted to 10; in this year Major Graves began his many articles on Turkey, Syria, and Egypt, numbering, with a few on other localities, as many as 15; these continued till 1928; Mr E. M. Dadd also contributed the first of his 2 articles on the neighbourhood of Berlin. Col. Manders also wrote for us for the first time. In 1906 and 1907 an accountable falling off occurred; there were but 5 articles in each of these years. In the latter Mr A. H. Jones wrote one of his only 2 articles. In 1908 began a series of years providing an exceptional output, marking our highest point in matter of this kind, which continued until the war made itself felt in 1915. The number of articles was as follows: 1908, 10; 1909, 13; 1910, 16; 1911, 10; 1912, 15; 1913, 14; 1914, and 1915, 11. In 1908 Mr Tetley began his series of 5 articles which continued till the war. In 1909 Mrs Page wrote the first of her 6 articles, only one of which appeared after the war in 1922, and the Hon. N. C. Rothschild the first of his two. In 1910 Mr Earl sent in his first paper on a Swiss locality, followed by two others in 1915 and 1916, the latter, of course, referring to earlier experiences. In the same year Mr B. C. S. Warren wrote of the neighbourhood of Freiburg, giving further papers of the same nature but different localities in 1913, 1921, and 1923. Mr Alderson, who usually wrote on English subjects, contributed a long article on the Rhone Valley, and Miss Dorothy Jackson, well known for her Scotch articles, made her only foreign contribution. In 1911 and 1912 two notable names occur for the first time in this connection; Mr Bethune-Baker wrote the first of his series of delightful accounts of foreign collecting which continued till the war, and were continued afterwards in 1921, 1922, 1926 and 1930. In the following year began Mr Ashby's long series of 19 contributions, which only ended at his very unexpected death at the beginning of 1936. In the same year appeared the first of Mr Curwen's two articles on foreign collecting, cut short by the outbreak of war. Dr Buxton also contributed his first article on this subject in the same year. In 1913 Mr Turner began to write on his experiences on the Continent. Being held up in the Engadine by the war beginning, he helped on the lean years of its continuance by giving his entomological experiences of that enforced addition to his visit. In 1914 there was a considerable period before the outbreak of war and in

1915 a good deal of previously written material was still available and the number of contributions kept up to 11. But during the war there were two other sources of supply. Entomologists in the army, when not in the fighting line, kept up their interest so far as they were able and we owed contributions of this kind in 1915 and the two following years to Dr Burr, Dr Buxton, Mr Barraud, and Col. Manders, the last of whom was killed at Gallipoli, his latest contribution being written in the trenches. The other source tapped during these years was found in the notes left by Mr A. J. Fison which had come into the hands of his great-niece. It seemed a pity that his vast unpublished experience of Swiss collecting should be lost, and I sent a large pile of postcards written to me by him, and which I had never had time to edit, to add to the notes Miss Fison possessed; large extracts from these helped to fill the gap in a useful and interesting way. Thus 1916 provided 6 articles and 1917 3. In 1918 began a hopeful revival with 8 contributions, but the number has varied much in different years and has only twice exceeded this figure, namely, in 1921 and 1931. It is easy to understand that entomological expeditions abroad have never reached their pre-war numbers, however much day-trips, etc., have increased. The crushing income-tax and latterly the terribly unsettled state of so much of Europe are between them a sufficient reason, and it is not surprising to find the number last year reduced to 2, and that even one of these came from S. America and the other from Kurdistan. In the post-war contributions a few of the old names occur, though, except those of Dr Burr, Major Graves and Mr Ashby, hardly with the former frequency. Among the 8 articles of 1918 Dr Robertson's name occurs for the first time in this connection, and as he writes again in 1932 and 1935 we may hope for further communications from him. In 1919 only 3 articles appeared and in 1920 only 4, all from former contributors, the same being the case with 7 of the 9 which made a post-war record in 1921. In 1922 and 1923 numbers kept up to 7, and again all the writers were old hands with only two exceptions. 1924 produced only 2 articles but amongst them a name by no means new, but new in this connection, that of Mr Fassnidge, who has already written 7 articles, and we may hope (circumstances permitting) that we may receive more from his pen. Another new name appears among the 4 contributors in 1925, namely, that of Mr Hayward, who has continued to send his experiences in the Argentine and neighbouring states in 8 articles, the last of which appeared last year. The contributions doubled in 1926 and again we welcome a new name, that of Mr Haig-Thomas, who has written 6 articles and we may hope for more. From 1927 numbers varied for the next ten years from 4 to 7 except in 1931 when they again rose to 9. The years 1927, 1930, and 1935 produced 7; 1933 and 1934, 6; 1929 and 1936, 5; 1928 and 1932, 4. Several names new, or new in this connection, appear in these years. Commander Forbes wrote in 1929 and 1931, Mr J. S. Taylor in 1930, 1931 and 1933, Mr Parkinson-Curtis (a well-known contributor on other subjects) in 1934, Mr Welsh in 1933 and 1934, Dr Harris in 1935 and 1937, Mr Hawker in 1935 and 1936, and Dr E. Scott in 1935. As the old names pass new ones begin to take their place and we may well hope that among these we may find regular contributors.

It is worth noting also that in addition to our English contributors an increasing number of foreigners have also sent in articles of the

same nature for publication in our magazine. The following is a list: Mons. C. Oberthür in 1899 and 1903, M. Portschinsky in 1901, Herr Gillmer in 1906, Dr Reverdin in 1910, Count E. Turati in 1912 and 1913, Signor Querci 5 articles between 1918 and 1935, Mons. Lhomme in 1923 and Dr Romei in 1927. Perhaps one should hardly include M. Uvarov as he is resident in England. Dr Verity's voluminous writings are not generally, though not infrequently, founded on personal expeditions, but some, as for instance, his two seasons in the Swiss Rhone Valley, are certainly of this nature. The number of our contributors on this subject has amounted to 87.

In comparing our output in this category with that of the *Entomologist* we find that while that of the latter considerably exceeded ours in the 'twenties, yet on the whole the numbers were greatly in our favour. I only mention this to show that if the *Ent. Rec.* had never been started, or if it had not made a special feature of this kind of article, a very large amount of interesting, and indeed valuable, material would inevitably have remained unpublished, and it shows also that the stimulus in this direction of our magazine must have been considerable.

It seems likely also that the large number of illustrations of the places visited which have been given by many of our correspondents have had a considerable share in inciting others to visit scenes of so much beauty and interest.

While on the one hand Lepidoptera form the subject of the vast majority of contributions other orders have not been neglected. Orthoptera make a good second. This is chiefly owing to Dr Burr's wide experience. He has contributed 27 articles on this order which include France, Switzerland, Spain, Austria, Belgium and Holland, Greece, Turkey and the Caucasus in Europe, Persia and Siberia in Asia, and the Canaries, Madeira, Cape de Verde Islands, the Congo, and Angora in Africa. M. Uvarov has written on the Orthoptera in Macedonia, M. Portschinsky in Transcaucasia, Mr Annandale in Siam, Dr H. Scott in the Pyrenees, and Dr Chapman on the Riviera.

With regard to the Coleoptera, of which so much has been written in respect of the British species, very little has reached us with regard to foreign countries. Mr Tutt wrote in 1905 of the Saas Valley and Mr Ashdown of other Swiss localities in 1908. Dr Cameron of those collected by Mr Dollman in Rhodesia in 1919, Mr Sevastopulo in India, and Mr Taylor of the Transvaal in 1933. Mr Taylor's article includes also notes on several other orders. This is also the case with most of Mr Ashby's contributions.

The Hymenoptera have received rather more attention. Mr Donisthorpe wrote of those collected in Mesopotamia by Dr Buxton and Lieut. Evans in 1918, and Mr Crawley of those collected by Prof. Poulton and others in Australia in the same year, though collected earlier, and in 1920 on those collected by Dr Buxton and Lieut. Evans in Persia; Mr Donisthorpe also wrote of those of Sicily in 1926 and 1927 and Dr Chapman had previously written of those collected in S. France by Mr Saunders.

There are two papers on the Neuroptera, and two on the Odonata; of the latter one was by Mr Lucas on those collected by Dr Chapman in E. France, and the other by Mr Taylor on those he collected in Peru

and Columbia; of the former one was by Mr Lucas on specimens collected by Mr Barraud and the other by Dr H. Scott in 1923 on those he collected in the Pyrenees.

One paper occurs on the Rhyncota by Dr Chapman on specimens collected by Mr Kirkaldy.

With regard to the countries in which collecting took place France appears the most popular with 91 articles on the subject; Switzerland comes next with 76; Italy has 37 and Spain 22. Greece has 13, Germany and the Tyrol 11 each, Turkey and Austria 8, 4 each are concerned with Norway and Belgium and 3 with Hungary. Finland, Bulgaria and Portugal are dealt with in 2 each and Malta in 1. These are all the European countries mentioned except for a few notes on Orthoptera in Holland. Although Sweden has been visited and reported on elsewhere we have no paper on the subject. Denmark and Holland seem to be left severely alone; this is strange as both are so easy of access; perhaps some entomologist may be found enterprising enough to visit them.

Outside Europe but still near it we find 3 papers on Algeria, 7 on Egypt, 13 on Syria (including Palestine) and 5 on Asia Minor. Further afield 2 treat of Persia, 6 of India (including Mr Sevastopulo's descriptions of Indian larvae found in Calcutta), 2 of Ceylon and 1 each of Java, Kurdistan and Hong Kong. Various parts of Africa are dealt with in 5 papers, and Central and South America in 13. These do not include the wide range visited by Dr Burr and cited above in writing of the Orthoptera. Contributors to the *Ent. Rec.* therefore cover a wide range and must advance in no slight degree the knowledge of distribution of species.

FIFTY YEARS IN OUR STUDY OF PROTECTIVE RESEMBLANCES AS EXEMPLIFIED IN THE ORDER INSECTA.

By SIR EDWARD B. POULTON, D.Sc., M.A., F.R.S., Hon. Life Pres.
R.E.S.L., F.R.E.S., F.L.S., &c.

In attempting to bring forward a brief account of work and discussion upon Protective Resemblance, Warning Colours, and Mimicry, both Batesian and Müllerian, during the past half century, it is, I think, well to devote a brief section to their earlier history.

One of the most significant of the early statements upon Protective Resemblance was that made by A. R. Wallace in his section of the joint essay on Natural Selection read before the Linnean Society on July 1st, 1858:—"Even the peculiar colours of many animals, more especially of insects, so closely resembling the soil or leaves or bark on which they habitually reside, are explained on the same principle; for though in the course of ages varieties of many tints may have occurred, *yet those races having colours best adapted to concealment from their enemies would inevitably survive the longest.*" Much earlier than this W. J. Burchell wrote of "the intention of Nature" in giving to the Chameleon its power of changing colour, and to a pebble-like Acridian and Mesembryanthemum a resemblance protecting them from their natural enemies (1). He also wrote of plants "in this arid country, where every juicy vegetable would soon be eaten up," being given "an acrid or poisonous juice, or sharp thorns, to preserve the species from annihilation" (2). Both Protective and Aggressive Resemblances were also